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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/998,193	12/03/2001	David G. Steer	91436-344	4347
22463	7590	12/13/2005	EXAMINER	
SMART AND BIGGAR 438 UNIVERSITY AVENUE SUITE 1500 BOX 111 TORONTO, ON M5G2K8 CANADA			JAGANNATHAN, MELANIE	
			ART UNIT	PAPER NUMBER
			2666	

DATE MAILED: 12/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/998,193

Applicant(s)

STEER ET AL.

Examiner

Melanie Jagannathan

Art Unit

2666

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 December 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7, 11-14 and 18-33 is/are rejected.
- 7) ☒ Claim(s) 5, 6, 8-10, 15-17 and 34 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-4, 7, 11-14, 18-19, 21-33 are rejected under 35 U.S.C. 102(e) as being anticipated by Pollack et al. US 6,192,026.

Regarding claim 1, the claimed receiving a received signal includes a remotely transmitted signal, where remotely transmitted signal is in a given frequency band is disclosed by OFDM communication system with access point receiving from data communication devices (DCD) during 190 bit RA burst (Figure 6, element 404) where each DCD can submit 38-bit access request messages referred to a RA channel. RA channels in burst are independent from one another. See column 7, lines 35-40, column 8, lines 52-67, column 9, lines 1-10. The claimed transmitting, concurrent with receiving, a locally transmitted signal in given frequency band, where locally transmitted signal is substantially orthogonal to remotely transmitted signal is disclosed by another DCD submits its own access request message during same RA burst, simultaneous access attempts can be heard by access point since in OFDM system, tones within a

burst (Figure 7) are independent from one another. See column 8, lines 52-67, column 9, lines 1-10.

Regarding claim 2, the claimed remotely transmitted signal has a first set of sub-carrier center frequencies, characterized by presence of signal, and a first set of zero signal frequencies, characterized by absence of signal is disclosed by access point receiving RA channel from DCD in RA burst (Figure 7, element 404). Each burst's tones are divided into mutually exclusive subsets, each subset constitutes one RA channel (Figure 7, element 602). Tones that are not assigned to a given RA channel are not energized by the DCD using that particular RA channel. See column 8, lines 65-67, column 9, lines 1-14. The claimed transmitting comprises transmitting locally transmitted signal having a second set of sub-carrier frequencies and second set of zero frequencies, where second set of sub-carrier center frequencies correspond in frequency to first set of zero signal frequencies and second set of zero signal frequencies correspond to frequency to first set of sub-carrier center frequencies is disclosed by DCD simultaneously transmitting access requests in RA burst on a RA channel assigned to each DCD. Each burst's tones are divided into mutually exclusive subsets, each subset constitutes one RA channel (Figure 7, element 602). Tones that are not assigned to a given RA channel are not energized by the DCD using that particular RA channel. See column 8, lines 65-67, column 9, lines 1-30.

Regarding claim 3, the claimed locally transmitted signal has a predefined symbol duration and sub-carrier center frequencies in second set of sub-carrier center frequencies have a frequency spacing equal to reciprocal of symbol duration is

disclosed by channel orthogonalized to prevent energy from frequency domain symbol from interfering with another frequency domain symbol by taking into account channel length. See column 5, lines 30-36, column 6, lines 22-45.

Regarding claim 4, the claimed second set of sub-carrier center frequencies is interleaved in frequency with first set of sub-carrier center frequencies is disclosed by RA burst (Figure 7, element 404). Each burst's tones are divided into mutually exclusive subsets, each subset constitutes one RA channel (Figure 7, element 602). Tones that are not assigned to a given RA channel are not energized by the DCD using that particular RA channel. See column 8, lines 65-67, column 9, lines 1-14.

Regarding claim 7, the claimed selecting second set of sub-carrier frequencies form a transmitter pseudo-random set of candidate center frequencies, transmitter pseudo-random set of candidate center frequencies is non-overlapping with receiver pseudo-random set of candidate center frequencies is disclosed by division of tones in RA burst into RA channels, where i th RA channel uses tones $n=i+8k$, $k=0, 1, \dots, 31$, for training and available data tones are assigned to RA channels in sequential fashion. . Each burst's tones are divided into mutually exclusive subsets, each subset constitutes one RA channel (Figure 7, element 602). Tones that are not assigned to a given RA channel are not energized by the DCD using that particular RA channel. See column 8, lines 65-67, column 9, lines 1-30.

Regarding claim 11, the claimed symbol timing offset from remotely transmitted signal and adjusting timing of symbols in locally transmitted signal based on determining is disclosed by AP returns a superframe to DCDs to accommodate any timing

uncertainties of DCDs associated with them contacting AP. It includes an XSYNC burst that permits the DCD to obtain frequency offset correction and burst timing. See column 11, lines 59-67, column 12, lines 1-13.

Regarding claims 12-14, the claimed generating an error signal from locally transmitted signal, attenuating error signal and subtracting error signal from received signal to suppress elements of locally transmitted signal in received signal and developing composite of multiple attenuated and phase-shifted copies of locally transmitted signal is disclosed by receiver captures signal, is fed into FFT to produce a received frequency spectrum. A symbol detection stage (Figure 3, element 316) corrects each point in received frequency-domain sequence for channel's amplitude scaling and phase shift at that frequency. The channel estimation circuit (element 318) uses training tones embedded in each burst to recover complex scalars for each of the 256 frequencies. Using the same bits-to-symbol mapping as transmitter, output bits are produced by bit mapper (element 320). See column 5, lines 64-67, column 6, lines 1-21.

Regarding claims 18-19, the claimed remotely transmitted is encoded using a first code and encoding locally transmitted using second code, second code is substantially orthogonal to first code is disclosed by RA channels from DCD in RA burst (Figure 7, element 404). In OFDM system, tones within burst are substantially independent from one another. Each burst's tones are divided into mutually exclusive subsets, each subset constitutes one RA channel (Figure 7, element 602). Tones that

are not assigned to a given RA channel are not energized by the DCD using that particular RA channel. See column 8, lines 65-67, column 9, lines 1-14.

Regarding claim 21, the claimed communications channel is wireless channel is disclosed by wireless system including access point (Figure 2, element 204) and multiple data communication devices (element 202) employing OFDM with shared network medium is frequency spectrum allocated for wireless network. See column 5, lines 13-22.

Regarding claims 22-26, 28, the claimed estimating characteristics of channel in given frequency band based on received signal, adjusting transmitting based on estimating characteristics, obtaining a Fourier transform of received signal, estimated characteristics based on FFT, recognizing pilot signal in FFT, adjusting a transmission power level, adjusting modulation technique, adjusting an antenna beam tracking technique is disclosed by receiver antenna captures signal, is fed into FFT to produce a received frequency spectrum. A symbol detection stage (Figure 3, element 316) corrects each point in received frequency-domain sequence for channel's amplitude scaling and phase shift at that frequency. The channel estimation circuit (element 318) uses training tones embedded in each burst to recover complex scalars for each of the 256 frequencies. Using the same bits-to-symbol mapping as transmitter, output bits are produced by bit mapper (element 320). See column 5, lines 64-67, column 6, lines 1-21.

Regarding claims 27,29, the claimed adjusting transmitting comprising adjusting a space-time coding technique is disclosed by coding may be employed in OFDM

system and Pollack disclosing cross-referenced Spatio-Temporal channel estimation.

See column 6, lines 11-21.

Regarding claims 30-33, the claimed apparatus comprising a receiver adapted to receive a received signal that includes a remotely transmitted signal in given frequency band, and a transmitter adapted to transmit, concurrent with receiving, a locally transmitted signal in given frequency band, locally transmitted signal is orthogonal to remotely transmitted signal is disclosed by OFDM system (Figure 3, element 300) with transmitter side of modem at DCD and receiver side of modem at AP, and comparable system with receiver of DCD and transmitter of AP. The base stations serve as APs and cellular phones serves as DCDs. See column 2, lines 3-16, column 5, lines 23-29. The access point receives RA channel from DCD in RA burst (Figure 7, element 404). Each burst's tones are divided into mutually exclusive subsets, each subset constitutes one RA channel (Figure 7, element 602). Tones that are not assigned to a given RA channel are not energized by the DCD using that particular RA channel. See column 8, lines 65-67, column 9, lines 1-14. DCDs can simultaneously transmit access requests in RA burst on a RA channel assigned to each DCD to AP.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pollack et al.

Pollack discloses all of the limitations of the claims except for orthogonal spreading codes are based on Walsh functions. At the time the invention was made it would have been obvious to modify Pollack's OFDM spreading codes to be based on Walsh functions. One of ordinary skill in the art would be motivated to do so eliminate any inter-carrier interference.

Allowable Subject Matter

5. Claims 5-6, 8-10, 15-17, 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Art Unit: 2666

Regarding claim 5, prior art of record does not disclose, in single or in combination, the first set of sub-carrier center frequencies have odd indices and second set of sub-carrier center frequencies have even indices in combination with other limitations of claims.

Regarding claim 6, prior art of record, does not disclose, in single or in combination, determining a traffic ratio, amount of downlink traffic in locally transmitted signal to amount of uplink traffic in remotely transmitted signal, wherein a ratio of number of center frequencies in first set of sub-carrier frequencies to number of center frequencies in second set of sub-carrier frequencies is proportional to traffic ratio in combination with other limitations of claims.

Regarding claims 8-9, prior art of record does not disclose, in single or in combination, the claimed switching pseudo-random sets of candidate center frequencies to new sets such that new transmitter pseudo-random set of candidate of center frequencies is non-overlapping with a new receiver pseudo-random set of candidate of center frequencies and new sets follows a pseudo-random pattern known to transmitter in combination with other limitation of claims.

Regarding claim 10, prior art of record does not disclose, in single or in combination, determining from Fourier transform of received signal, frequency values of first set of zero signal frequencies and adjusting second set of sub-carrier frequencies to correspond in frequency to first set of zero signal frequencies in combination with other limitation of claims.

Regarding claims 15-17, prior art of record does not disclose, in single or in combination, detecting an amount of locally transmitted signal in received signal and

based on detecting, adjusting generating of error signal based on power levels to suppress elements of locally transmitted signal, obtaining a Fourier transform of received signal and from Fourier transform, determining power levels of second set of sub-carrier frequencies of in combination with other limitation of claims.

Regarding claim 34, prior art of record does not disclose, in single or in combination, re-allocating plurality of sub-carrier center frequencies to a new first subset and new second subset based on measuring of traffic flow from mobile terminal to base station and vice versa, and communicate identities of sub-carrier frequencies allocated to new first and second subsets to base station and mobile terminal in combination with other limitation of claims.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Laroia et al. US 6,473,418.

Sudo US 6,937,557.

Baum et al. US 6,959,050.


Bohnke US 6,731,594.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melanie Jagannathan whose telephone number is 571-272-3163. The examiner can normally be reached on Monday-Friday from 8:00 a.m.-4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MJ
12/9/2005



FRANK DUONG
PRIMARY EXAMINER